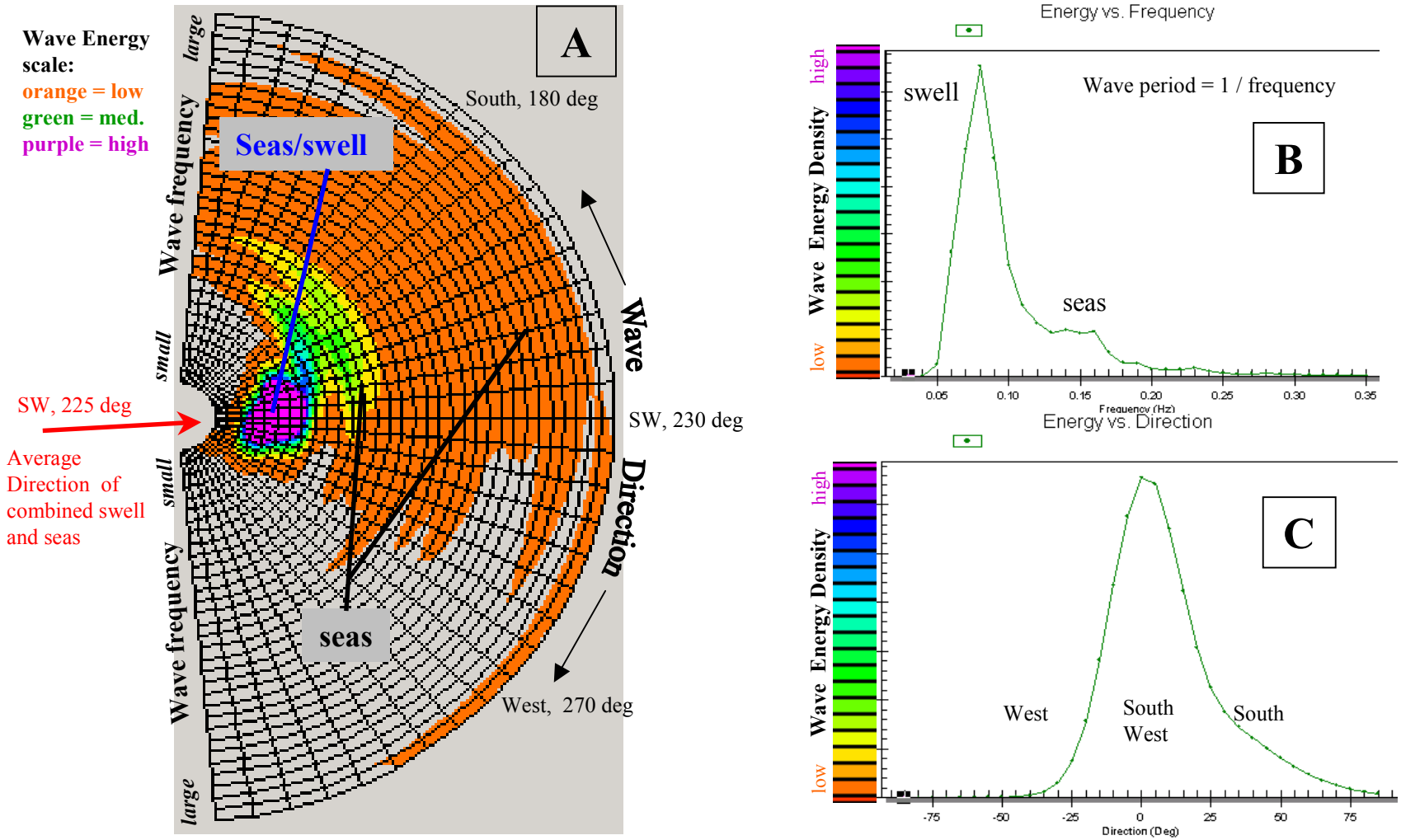
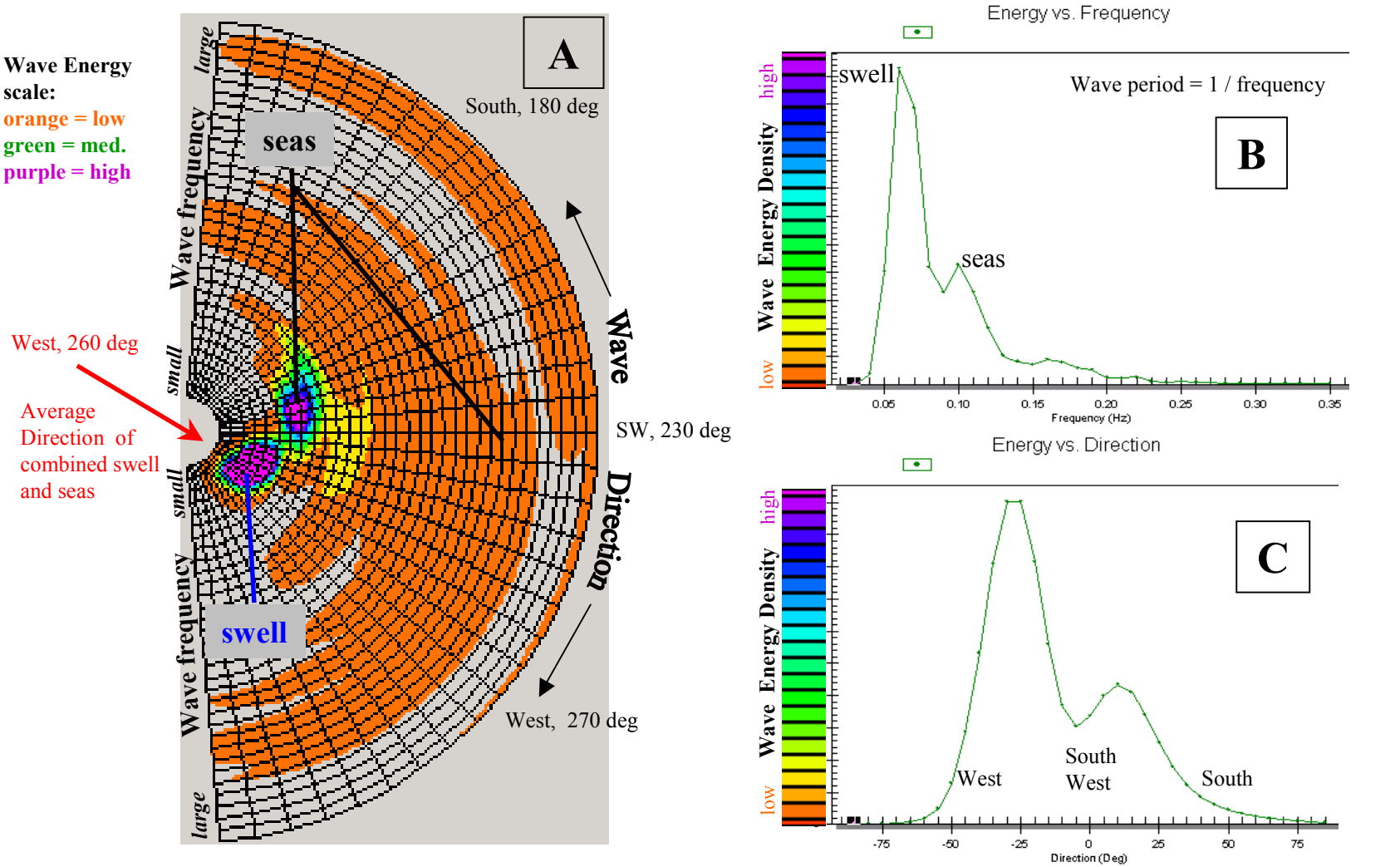
SOUTH-SOUTHWEST Wave Boundary Conditions
Used as "wave" input in the STWAVE Model to Assess Wave-Related Effects due to Bathymetry Change at the Mouth of the Columbia River and Various Utilization Scenarios for the Shallow Water ODMDS

Offshore Wave Data from NDBC buoy 46029; 20 miles offshore MCR



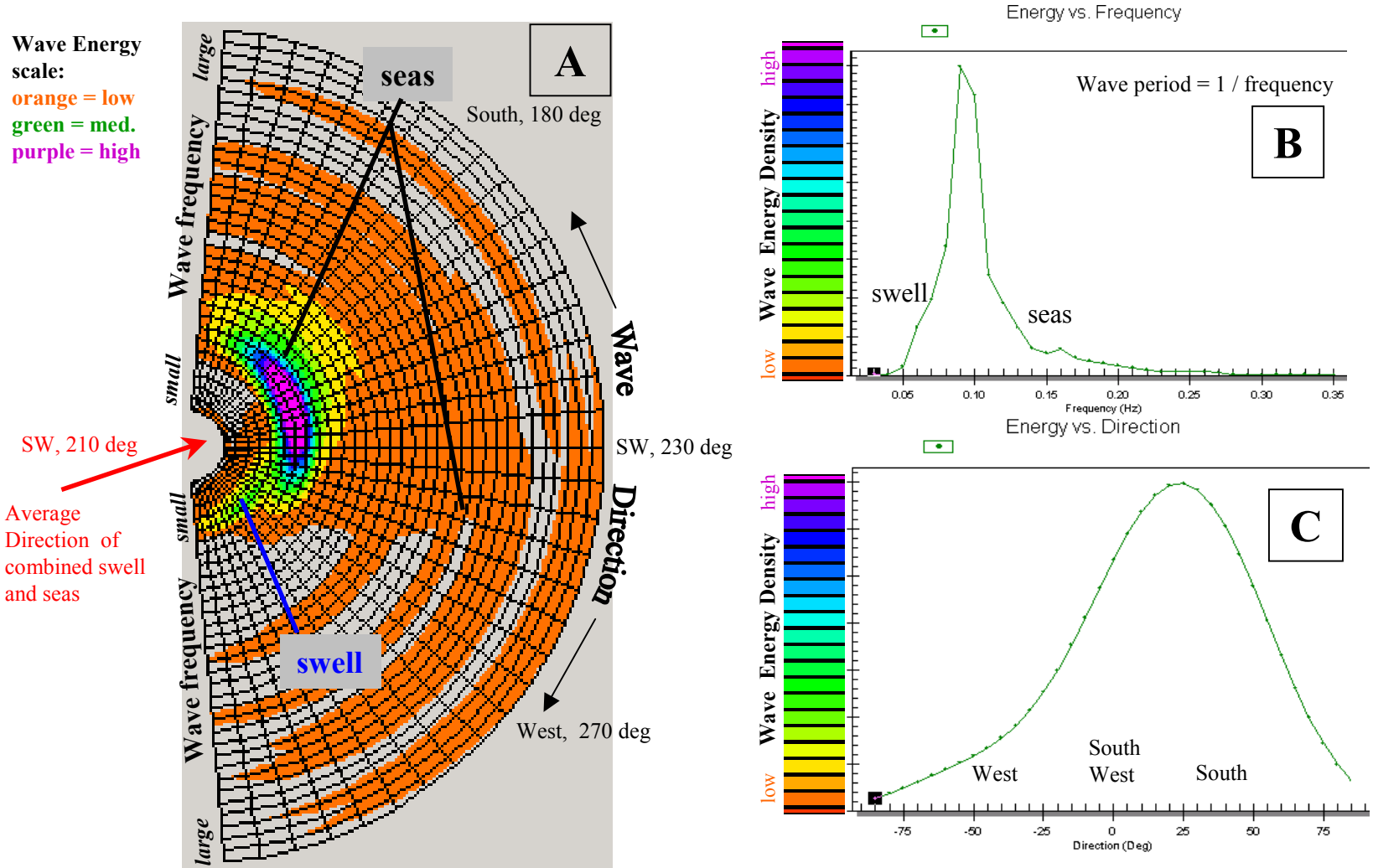
Winter Storm: Avg. wave height = 6.48 m, Peak wave period =12.5 sec, Avg. wave direction = SW (225 deg), Wind=13.8 m/s @ S (180 deg)

Figure S1. Energy spectrum for waves composed of locally generated swell and seas. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell is from the SW; the seas include a wide range of frequency and direction; the wave field is a mix of local swell and seas.



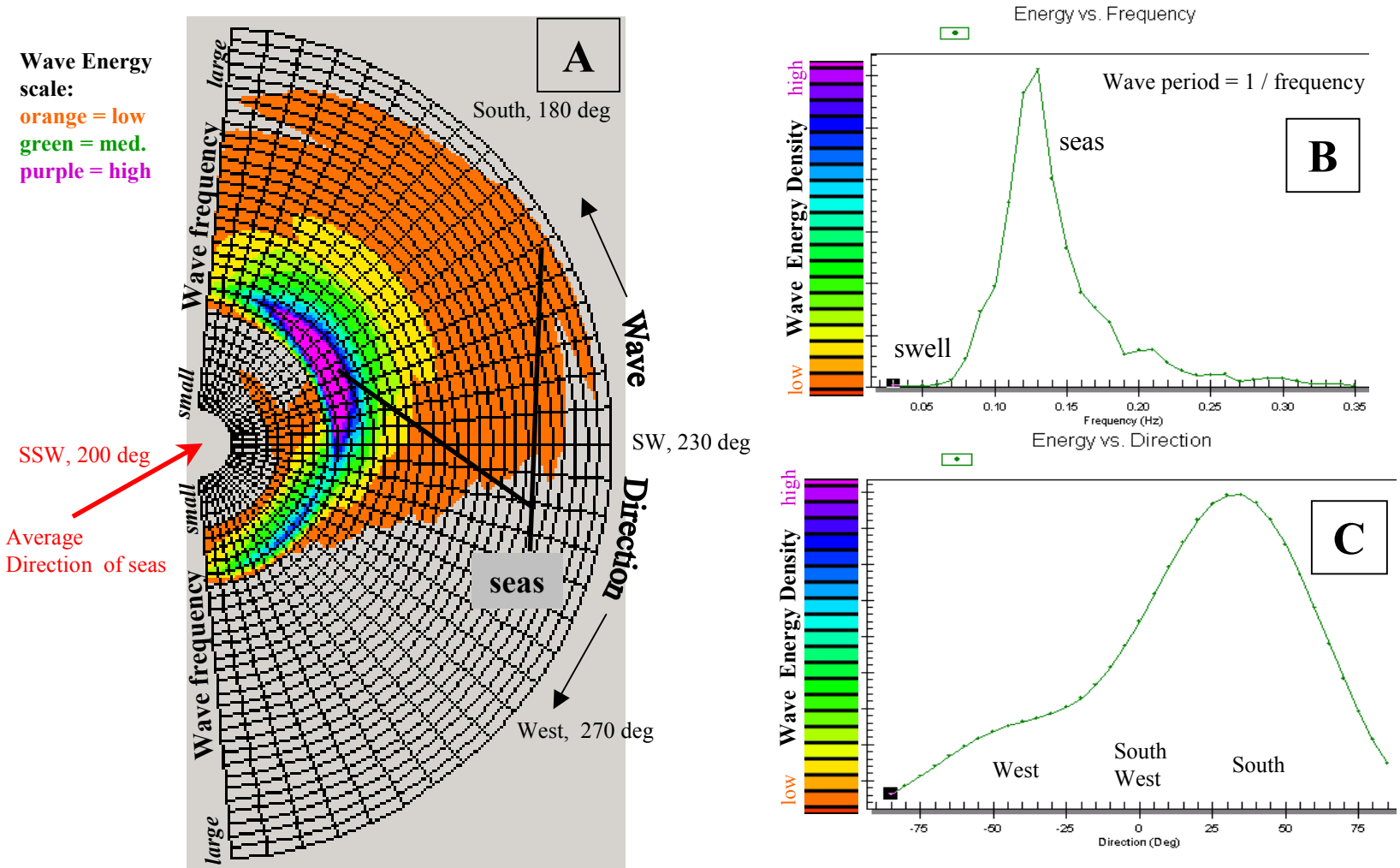
Winter Storm: Avg. wave height = 8.34 m, Peak wave period=16.7 sec, Avg. wave direction =W (260 deg), Wind=14.2 m/s @ S (192 deg)

Figure S2. Energy spectrum for waves composed of swell and seas from two storms. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell is from the W; the seas include a wide range of frequency and direction; the wave field is a bi-modal combination of swell and seas.



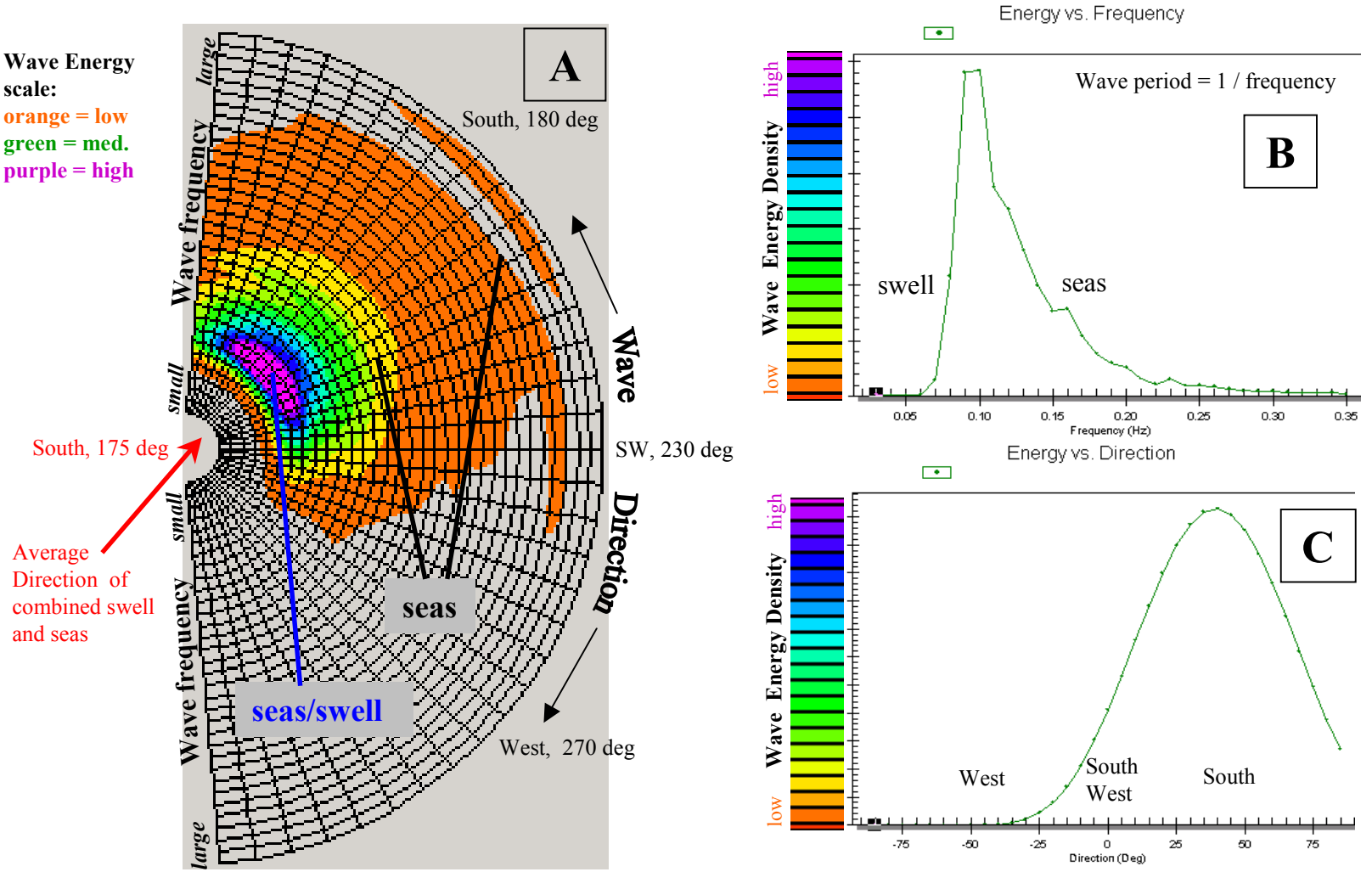
Winter Storm: Avg. wave height = 6.76 m, Peak wave period =10.5 sec, Avg. wave direction=SW (210 deg), Wind=13.8 m/s @ S (180 deg)

Figure S3. Energy spectrum for waves composed of locally generated seas and some swell. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell is from the W; the seas include a wide range of frequency and direction; the wave field is dominated by seas.



Summer Storm: Avg. wave height = 3.56 m, Peak wave period=7.7 sec, Avg. wave direction = SSW (200 deg), Wind=10.6 m/s @ S (178 deg)

Figure S4. Energy spectrum for waves composed of locally developed seas. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. Most of the seas are from the S; there is is distinct component from the W; the wave field is dominated by locally generated seas.

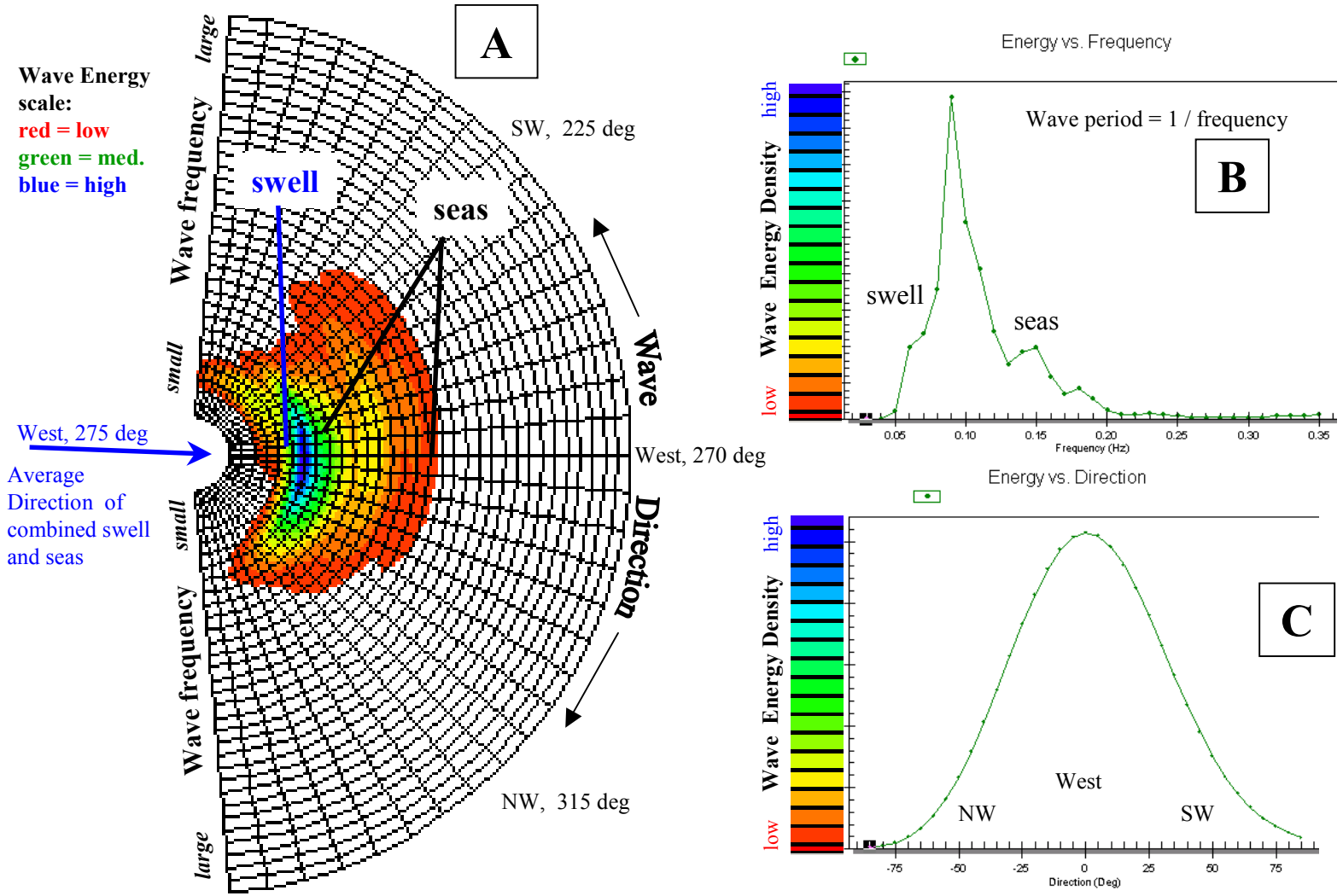


Summer Storm: Avg. wave height = 3.51 m, Peak wave period=10.5 sec, Avg. wave direction = S (175 deg), Wind=8.8 m/s @ SE (165 deg)

Figure S5. Energy spectrum for waves composed of locally developed seas. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell is from the S; the seas include a wide range of frequency and direction; the wave field is a mix of local swell and seas.

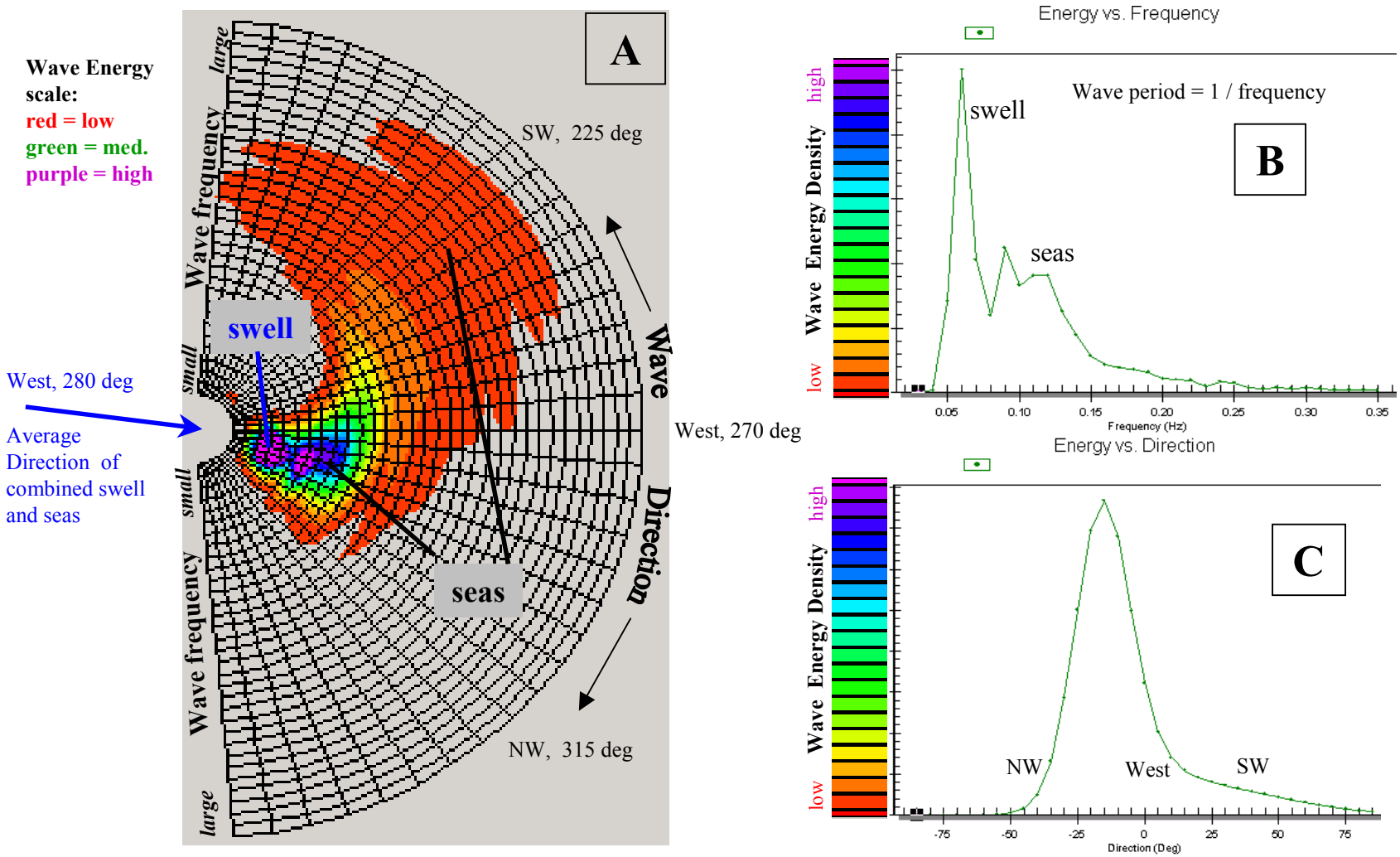
WEST-NORTHWEST Wave Boundary Conditions
Used as "wave" input in the STWAVE Model to Assess Wave-Related Effects due to Bathymetry Change at the Mouth of the Columbia River and Various Utilization Scenarios for the Shallow Water ODMDS

Offshore Wave Data from NDBC buoy 46029; 20 miles offshore MCR



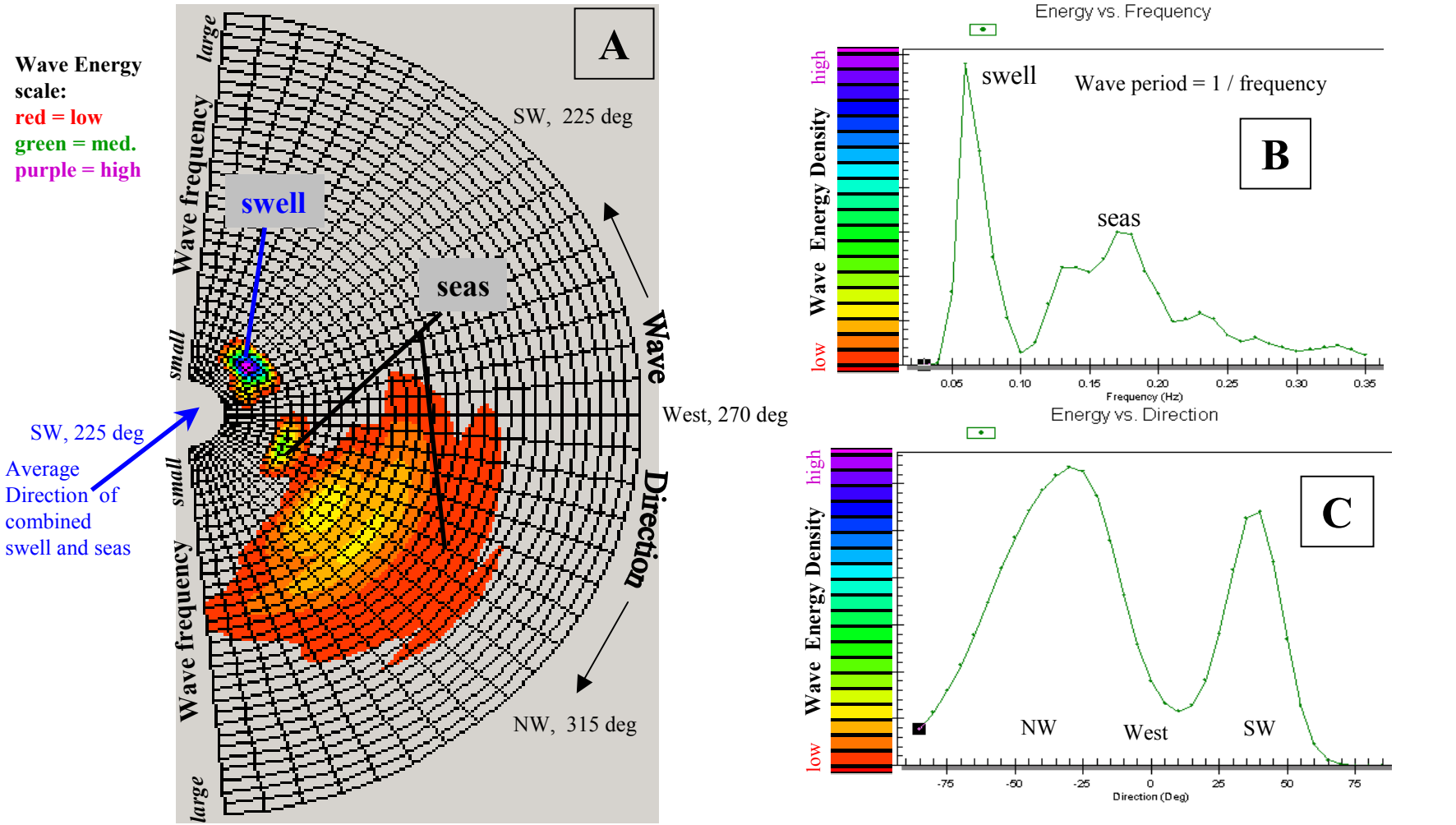
Summer Swell: Avg. wave height = 1.79 m, Peak wave period =11.0 sec, Avg. wave direction = W (275 deg), Wind=5.9 m/s @ NW (329 deg)

Figure S6. Energy spectrum for waves composed of local seas (chop) and some swell. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. Note that swell is approaching from west and seas include a wide range of direction and period; the wave field is a mix of swell and seas.



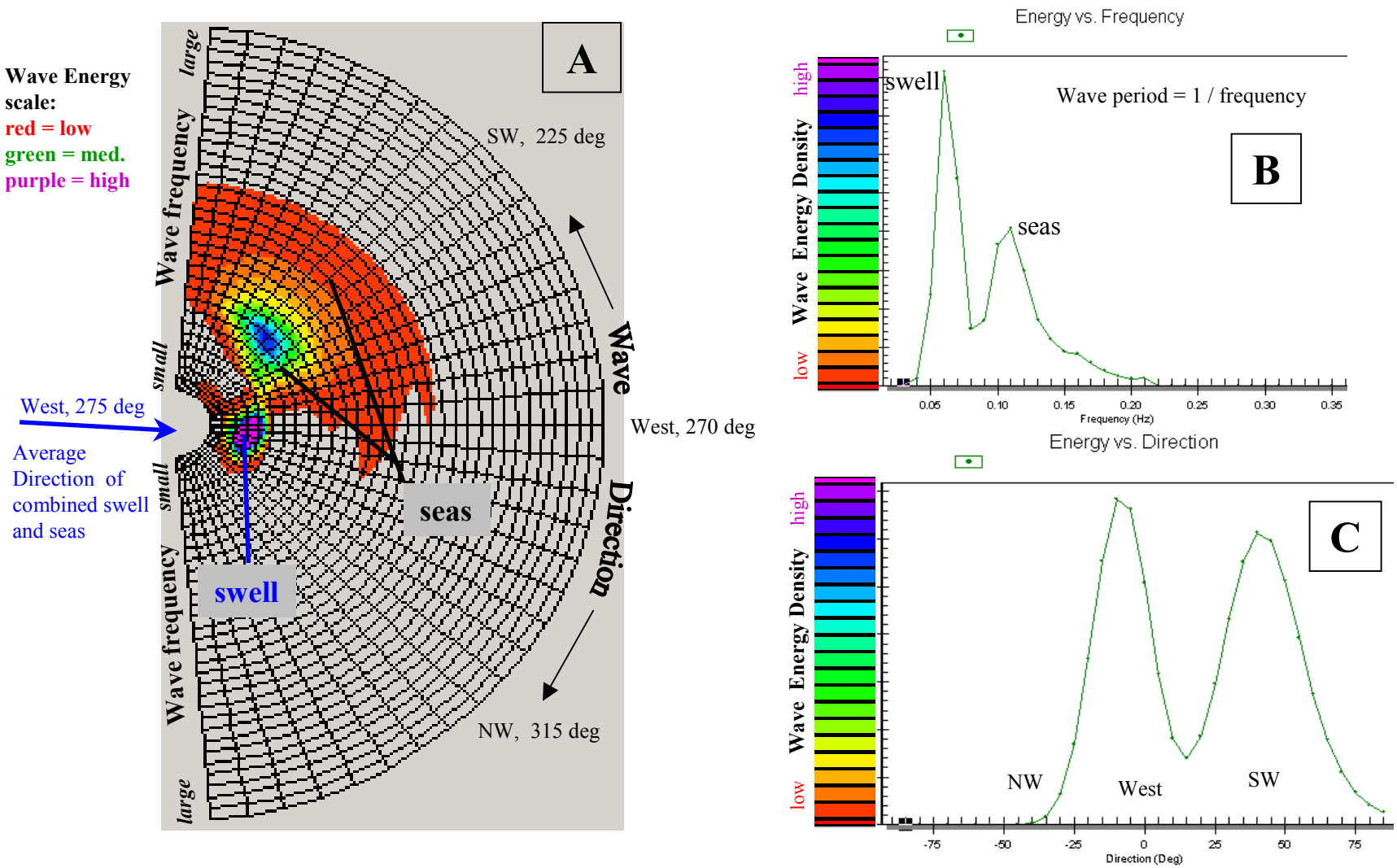
Winter Swell: Avg. wave height = 2.85 m, peak wave period=16.7 sec, Avg. wave direction = W (280 deg), Wind=4.8 m/s @ SE (158 deg)

Figure S7. Energy spectrum for waves composed of swell and seas. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell has a long period and is from one direction (WNW); the seas include a wide range of frequency and direction; the wave field is a mix of swell (distant source) and seas (local source). The most "powerful part of the seas is coming from the same direction as the swell.



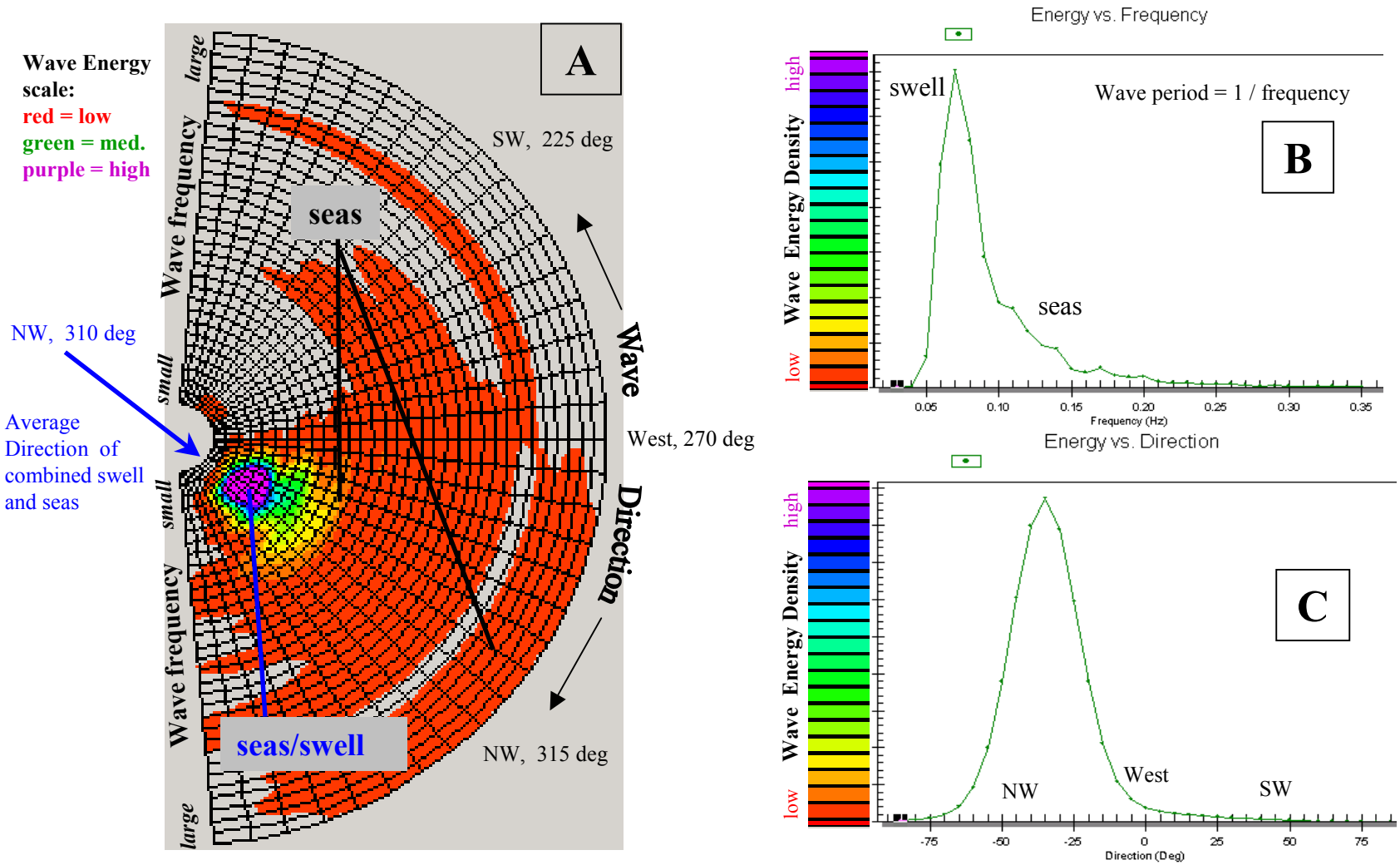
Summer Swell: Avg. wave height = 1.29 m, peak wave period=16.7 sec, Avg. Wave direction =SW (225 deg), Wind=5.4 m/s @ NW (316 deg)

Figure S8. Energy spectrum for waves composed of swell and seas. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell has a long period, is from one direction (SW), and distinctive from the seas; the seas include a wide range of frequency and direction; the wave field is a bi-modal combination of swell (distant source) and seas (local source).



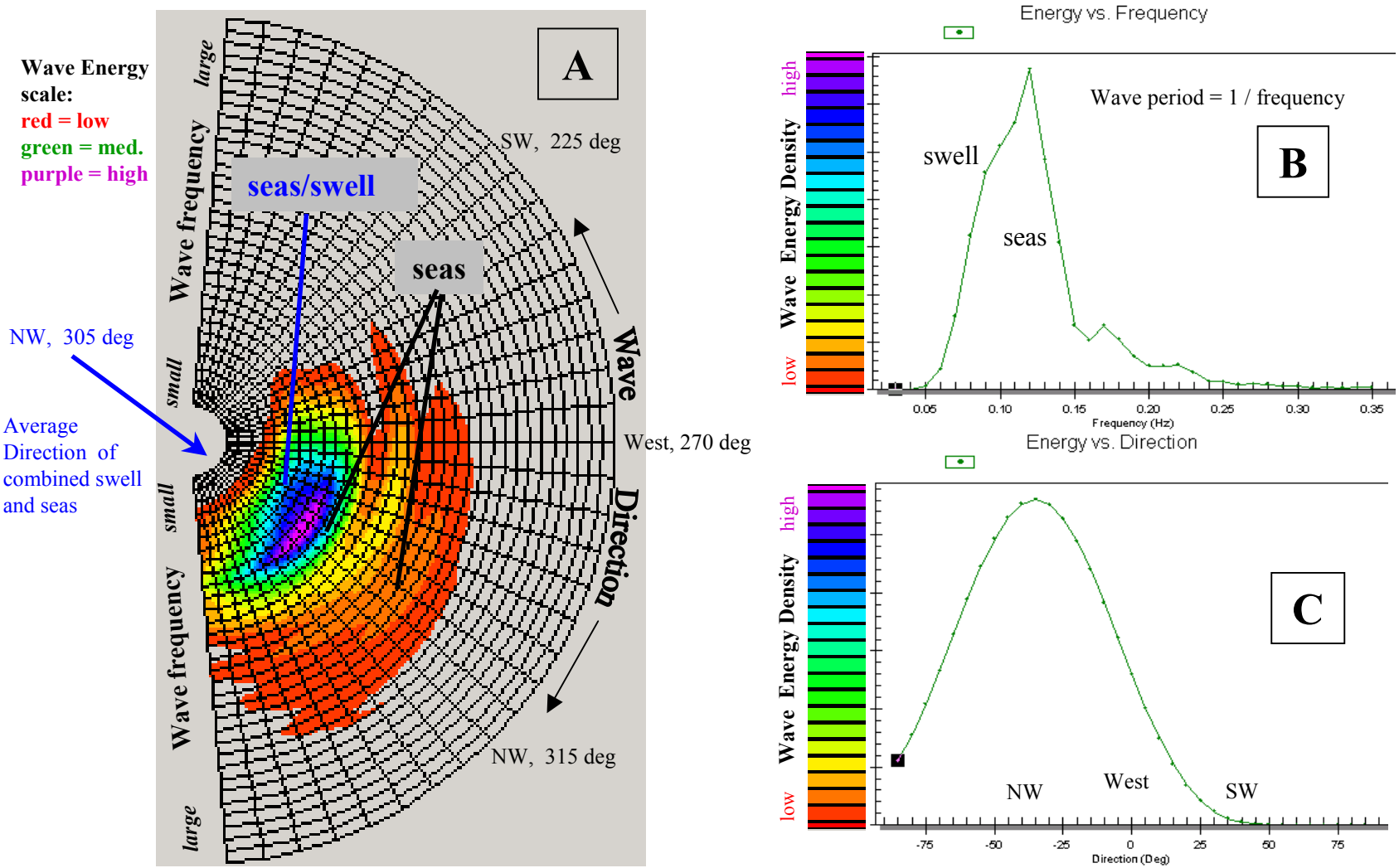
Winter Swell: Avg. wave height= 3.75 m, peak wave period =16.7 sec, Avg. wave direction =W (275 deg), Wind=6.9 m/s @ E (108 deg)

Figure S9. Energy spectrum for waves composed of swell and seas. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell has a long period, is from one direction (W), and distinctive from the seas; the seas include a wide range of frequency and direction,with the peak energy from SW; the wave field is a bi-modal combination of swell (distant source) and seas (local source).



Winter Storm: Avg. wave height = 6.55 m, peak wave period =14.0 sec, Avg. wave direction = NW (310 deg), Wind=10.4 m/s @ NW (294 deg)

Figure S10. Energy spectrum for waves composed of swell and seas generated by a nearby storm. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the direction axis in (A), to show where the most energy is in terms of wave direction. The swell and seas are from the NW; the seas include a wide range of frequency and direction; the wave field is a mix of locally generated swell and seas.



Summer Swell: Avg. wave height = 1.77 m, peak wave period =8.3 sec, Avg. wave direction = NW (305 deg), Wind=2.1 m/s @ NW (334 deg)

Figure S11. Energy spectrum for waves composed of locally developed seas and swell. Graphic (A) shows the wave energy distribution in terms of wave direction and frequency. Graphic (B) is a x-section thru the areas of maximum energy, along the frequency axis in (A), to show where the most energy is in terms of frequency . Graphic (C) is a x-section thru the areas of maximum energy, along the wave direction axis in (A), to show where the most energy is in terms of wave direction. The swell and seas are from the NW; the seas include a wide range of frequency and direction; the wave field is a mix of locally generated swell and seas.